2019 COMMUNICATIONS ACADEMY

April 13, 2019

CISA
CYBER+INFRASTRUCTURE

Bruce Richter April 5, 2019

CYBERSECURITY &
INFRASTRUCTURE
SECURITY AGENCY

Cybersecurity and Infrastructure Security Agency (CISA)

VISION

A Nation with secure and resilient critical infrastructure that ensures our security, economic prosperity, and way of life.

MISSION

Strengthen the Nation's cyber and physical infrastructure by managing and reducing systemic and catastrophic risk in partnership with the private sector, collaboration with the public sector, and protection of federal government networks.

CYBERSECURITY &
INFRASTRUCTURE
SECURITY AGENCY

Who We Are

CISA works with public sector, private sector, and government partners to share information, build greater trust, and lead the national effort to protect and enhance the resilience of the Nation’s physical and cyber infrastructure.

EMERGENCY COMMUNICATIONS

PROACTIVE CYBER PROTECTION

INFRASTRUCTURE RESILIENCE & FIELD OPERATIONS

FEDERAL NETWORK PROTECTION

16 Critical Infrastructure Sectors & Corresponding Sector-Specific Agencies

CHEMICAL	DHS (CISA)
COMMERCIAL FACILITIES	DHS (CISA)
COMMUNICATIONS	DHS (CISA)
CRITICAL MANUFACTURING	DHS (CISA)
DAMS	DHS (CISA)
DEFENSE INDUSTRIAL BASE	DOD
EMERGENCY SERVICES	DHS (CISA)
ENERGY	DOE
FINANCIAL	Treasury
FOOD & AGRICULTURE	USDA & HHS
GOVERNMENT FACILITIES	GSA & DHS (FPS)
HEALTHCARE & PUBLIC HEALTH	HHS
INFORMATION TECHNOLOGY	DHS (CISA)
NUCLEAR REACTORS, MATERIALS AND WASTE	DHS (CISA)
TRANSPORTATIONS SYSTEMS	(TSA & USCG)
WATER	EPA

CYBERSECURITY &
INFRASTRUCTURE
SECURITY AGENCY

Emergency Communications Division

VISION

Seamless flow of emergency communications (voice, video, and data) in support of daily operations and incident response

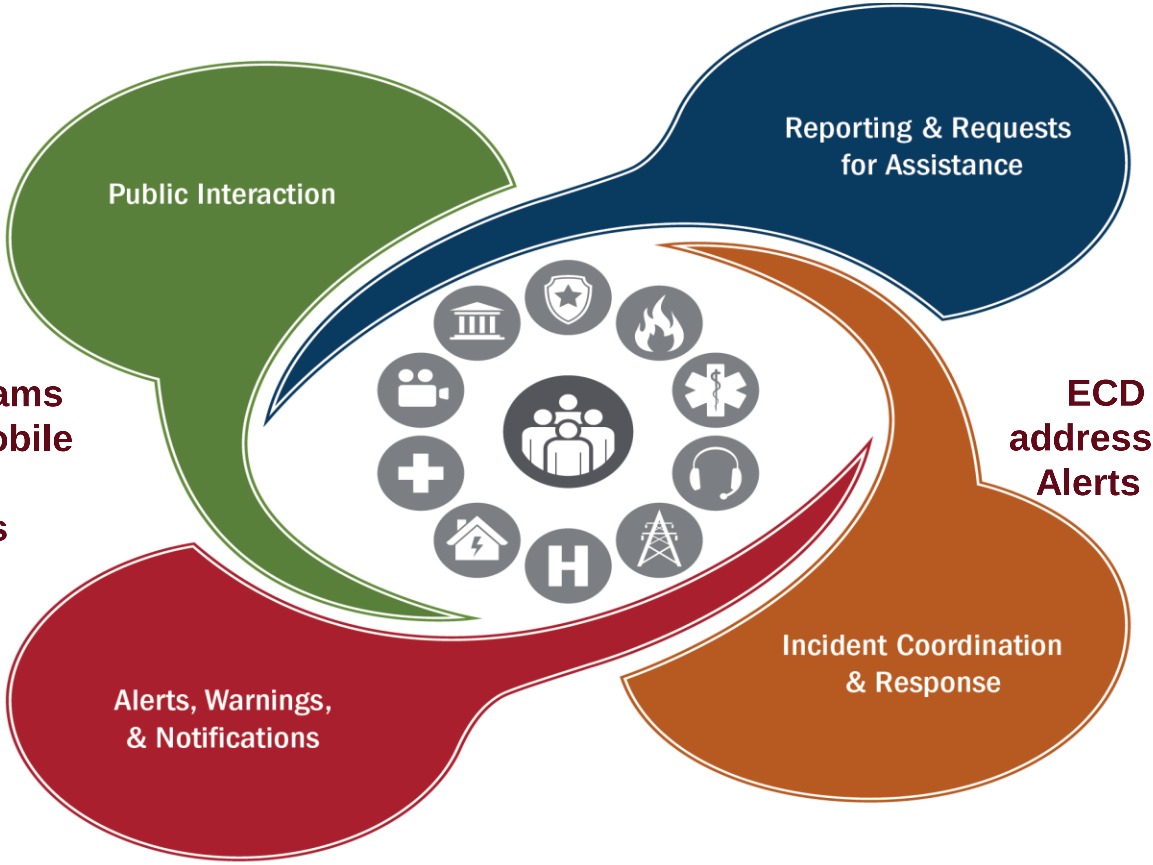
MISSION

Ensure emergency communications interoperability

ECD Scope of Work

ECD builds capacity to ensure emergency communications interoperability for all stakeholders, across all levels of government

Initially, ECD programs focused on Land Mobile Radio (LMR) communications


Public Interaction
Reporting & Requests for Assistance
Incident Coordination & Response
Alerts, Warnings, & Notifications

ECD programs now address LMR, Broadband, Alerts & Warnings, and NG911

EMERGENCY COMMUNICATIONS DIVISION

The Emergency Communications Division ensures Public Safety has the tools needed to communicate during steady state and emergency operations.

MISSION PRIORITIES:

- Develop and implement nationwide emergency communications policy and plans, including the National Emergency Communications Plan and 56 Statewide Communications Interoperability Plans.
- Assist in the development of the SAFECOM Guidance on Emergency Communications Grants.
- Build capacity with Federal, State, Local, Tribal, and Territorial stakeholders by providing technical assistance, training, resources, and guidance.
- Provide priority telecommunications services over commercial networks to enable national security and emergency preparedness personnel to communicate during congestion scenarios across the nation.
- Support nationwide sharing of best practices and lessons learned through facilitation of the SAFECOM and ECPC governance bodies.

CORE COMPETENCIES

Emergency Communications

CISA enhances public safety interoperable communications at all levels of government.

Publish Annual SAFECOM Guidance on Emergency Communications Grants referenced in 18 out of 22 federal grant programs that fund emergency communications activities.

Since 2008, trained more than 10,000 public safety officials on National Incident Management System, Incident Command Structure positions within the Communications Unit.

In FY18, completed 182 technical assistance engagements on communications operability and interoperability in 47 states and territories.

GETS call completion rates were over 98% and WPS call completion rates were over 92% for recent hurricanes including Hurricane Lane, Florence, and Michael (commercial grade average is less than 50%).

SAFECOM

- 65 members representing 31 public safety and intergovernmental associations
- Works to improve multi-jurisdictional and intergovernmental communications interoperability
- Coordinates with existing federal communications programs, elected and appointed officials, and key emergency response stakeholders
- Promulgates best practices, lessons learned, and planning tools

SAFECOM™
ASSURING A SAFER AMERICA THROUGH
EFFECTIVE PUBLIC SAFETY COMMUNICATIONS

MAJOR CITIES CHIEFS ASSOCIATION

METROPOLITAN FIRE CHIEFS

THE UNITED STATES CONFERENCE OF MAYORS

INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE

INTERNATIONAL FIRE CHIEFS ASSOCIATION

NATIONAL SHERIFFS' ASSOCIATION

NLC NATIONAL LEAGUE OF CITIES

NASNA National Association of State 911 Administrators

APCO International
Leaders in Public Safety Communications

NACo NATIONAL ASSOCIATION of COUNTIES

NEMA

NCSWIC

NPSTC

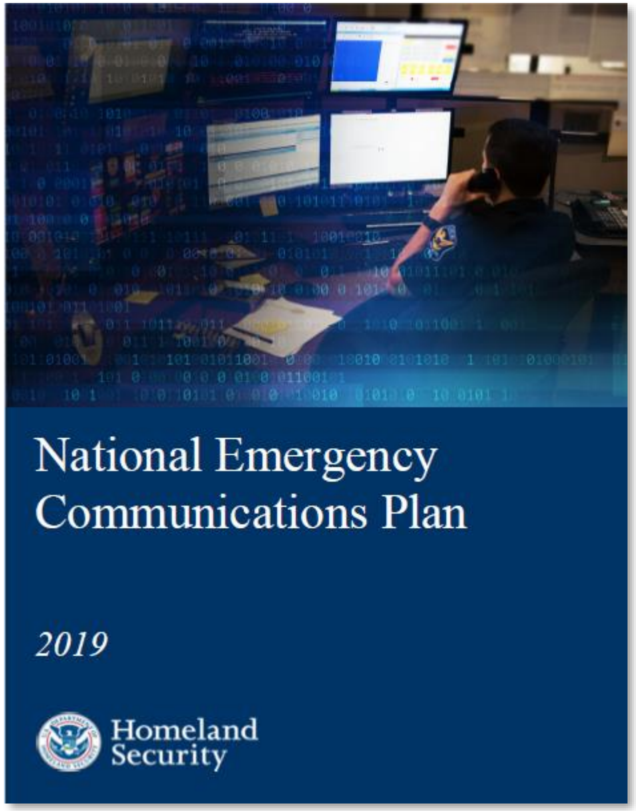
NENA THE 9-1-1 ASSOCIATION

NECP Overview

- The **National Emergency Communications Plan** (NECP) is the Nation’s strategic guiding document for enhancing emergency communications capabilities
- Priorities:
  - Enhance effective governance across partners with a stake in emergency communications, embracing a shared responsibility of the whole community
  - Address interoperability challenges posed by rapid technology advancements and increased data sharing, ensuring critical information gets to the right people at the right time
  - Build resilient and secure emergency communications systems to reduce cybersecurity threats and vulnerabilities

2019 NECP Update

- The 2019 NECP draft plan can be found at: https://www.dhs.gov/publication/2014-national-emergency-communications-plan


National Emergency Communications Plan

2019

Homeland Security

Mobile Apps Available

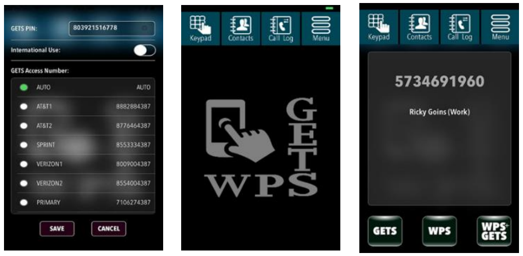
eNIFOG

- The National Interoperable Field Operations Guide (NIFOG) is a technical reference for emergency communications planning and for technicians responsible for radios that will be used in disaster response.
    - The app can be downloaded and used in the field as an offline reference.
- Available on Apple® iOS™ and Google® Android™ devices

National Interoperability Field Operations Guide
Homeland Security
eNIFOG
INTRODUCTION
Expand All / Collapse All
USING THE NATIONAL INTEROPERABIL...
INTEROPERABILITY CHANNELS
COMMON COMMUNICATIONS REFEREN...
COMMONLY USED FREQUENCIES
EMERGENCY MEDICAL PROCEDURES
JUMP MENU
CHARTS AND MAPS
RS-232 Connectors pin layout
RJ-45 Wiring layout
Telephone Block Wiring
Telephone Connector Wiring
Government Emergency Telecommunications Service Card- Front
Interoperability Plan

GETS/WPS Dialer

- For existing GETS and/or WPS subscribers, the ECD Dialer app provides a simplified way to make GETS and WPS calls by:
    - Eliminating dialing errors
    - Providing a convenient call log that speeds up calling process
- Available on Apple® iOS™ - Search for "**PTS Dialer**" in the app store.
- Download the Android PTS dialer: https://gets-wps.csgov.com/apps/



GETS PIN: 803921516778

International Use:

GETS Access Number:

●	AUTO	AUTO
○	AT&T1	8882884387
○	AT&T2	8776464387
○	SPRINT	8553334387
○	VERIZON1	8009004387
○	VERIZON2	8554004387
○	PRIMARY	7106274387

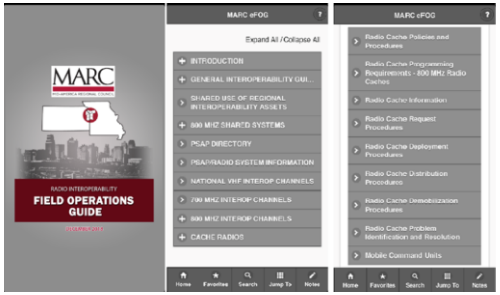
5734691960

Ricky Goins (Work)

Mobile Apps Available

MARC eFOG

- Developed for the Mid-America regional Council (MARC) as an ICTAP Technical Assistance request, the application distribution is passcode controlled. The app gives users easy access to information and supplements a hard copy, with shortcuts to reference sections, tables, figures, or images.
- Available on Apple® iOS™ and Google® Android™ devices


MARC
RADIO INTEROPERABILITY
FIELD OPERATIONS GUIDE
MARC eFOG
Expand All / Collapse All
INTRODUCTION
GENERAL INTEROPERABILITY GUI...
SHARED USE OF REGIONAL INTEROPERABILITY ASSETS
800 MHZ SHARED SYSTEMS
PSAP DIRECTORY
PSAP/RADIO SYSTEM INFORMATION
NATIONAL VHF INTEROP CHANNELS
700 MHZ INTEROP CHANNELS
800 MHZ INTEROP CHANNELS
CACHE RADIOS
Radio Cache Policies and Procedures
Radio Cache Programming Requirements - 800 MHz Radio Caches
Radio Cache Information
Radio Cache Request Procedures
Radio Cache Deployment Procedures
Radio Cache Distribution Procedures
Radio Cache Demobilization Procedures
Radio Cache Problem Identification and Resolution
Mobile Command Units
Home
Favorites
Search
Jump To
Notes

Auxiliary Communications eFOG

- ECD developed a guide for auxiliary communications personnel (amateur radio, CERT, other volunteers) that is similar to the NIFOG.
  - First U.S. Government mobile application accepted in the FirstNet app library.
  - Free distribution; no printed copies were produced.
- Available on Apple® iOS™ and Google® Android™ devices

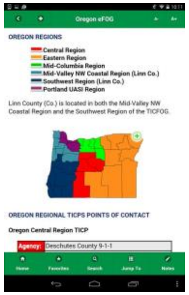
Auxiliary Communications Field Operations Guide (AUXFOG)
Homeland Security
Introduction
About this Guide
Expand All / Collapse All
Interoperability Definition
Safety
Appendix A - Auxiliary Communicatio...
Appendix B - Telephone Network C...
Appendix C - US Amateur Radio Ba...
Appendix D - Field Expedient Ante...
Appendix E - Connectors
Appendix F - Cable Properties
JUMP MENU
CHARTS AND MAPS
TABLES

CISA
CYBER+INFRASTRUCTURE

Other Mobile Apps Worth a Look

Oregon eFOG

- Developed by the State of Oregon and available as a free download.
- *Oregon eFOG* app is an electronic reference of the Oregon Regional Tactical Interoperable Communications Field Operations Guide
- Available for Apple® iOS™ and Google® Android™ devices



OREGON REGIONS

🟥 Central Region
🟧 Eastern Region
🟩 Mid-Columbia Region
🟦 Mid-Valley NW Coastal Region (Linn Co.)
🟦 Southwest Region (Linn Co.)
🟪 Portland UASI Region

Linn County (Co.) is located in both the Mid-Valley NW Coastal Region and the Southwest Region of the TICFOG.

OREGON REGIONAL TICPS POINTS OF CONTACT

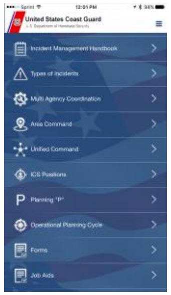
Oregon Central Region TICP

Agency: Deschutes County 9-1-1

Coast Guard IMH

USCG Incident Management Handbook now an app

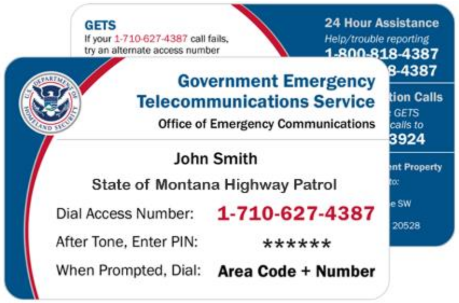
- Contains job aids, ICS positions, ICS Forms, the Planning "P" as well as other helpful information needed during a response.
- Available for Apple® iOS™ and Google® Android™ devices


Sprint
12:01 PM
United States Coast Guard
U.S. Department of Homeland Security
Incident Management Handbook
Types of Incidents
Multi Agency Coordination
Area Command
Unified Command
ICS Positions
Planning "P"
Operational Planning Cycle
Forms
Job Aids

Next Generation Network-Priority Services

Priority Services programs provide national security and emergency preparedness and public safety users with the ability to communicate on telecommunications networks during times of congestion.

- Provides continuity of government for emergency communications interoperability
- Increased user adoption improves resiliency of priority access on the network
- Approximately 3,000 state police leveraged during Hurricane Florence



GETS
If your 1-710-627-4387 call fails,
try an alternate access number

24 Hour Assistance
Help/trouble reporting
1-800-818-4387
8-4387
tion Calls
GETS
calls to
3924
nt Property
to:
e SW
20528

Government Emergency Telecommunications Service
Office of Emergency Communications

John Smith
State of Montana Highway Patrol

Dial Access Number: **1-710-627-4387**
After Tone, Enter PIN: ******
When Prompted, Dial: **Area Code + Number**

Priority Services Contact Information

Colleen Wright

GETS/WPS/TSP

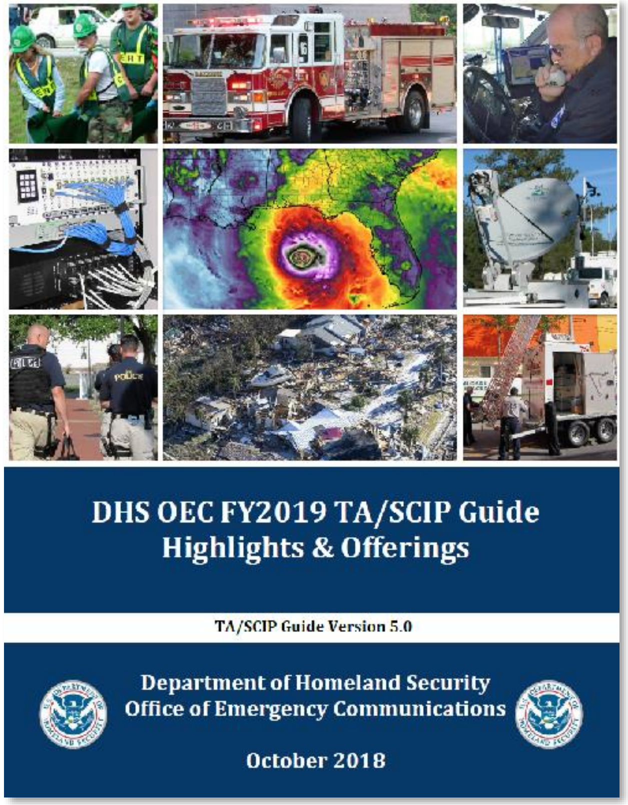
Priority Telecommunications Services Area Representative (PAR) – Regions VIII and X

Mobile: (202) 499-9800

colleen.wright@associates.hq.dhs.gov

FY2019 Technical Assistance

- Typically, States and Territories may receive up to five deliveries annually
- Priority deliveries are on Governance, SOP, Technology, Training and Usage – all lanes from the SAFECOM Continuum
- FY19 TA/SCIP Guide is available here: https://www.dhs.gov/ictapscip-resources



DHS OEC FY2019 TA/SCIP Guide
Highlights & Offerings

TA/SCIP Guide Version 5.0

Department of Homeland Security
Office of Emergency Communications

October 2018

ITSL Courses

- **Information Technology Service Unit Leader** (ITSL) classes :
  - Seattle, WA (April 29 – May 3, 2019) (**FULL**)
  - Denver, CO (May 5 –10, 2019)
- The following ITSL classes are tentative:
  - New York, NY (June 3 – 7, 2019)
  - Chicago, IL (June 10 – 14, 2019)
- FY19 CISA ECD Annual Training Calendar is available here: https://www.dhs.gov/ictapscip-resources

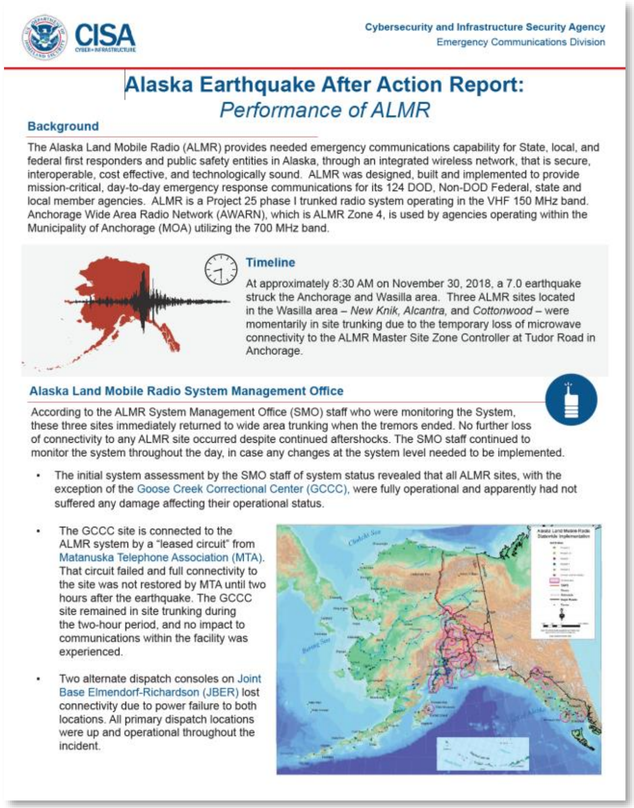
Tribal Assistance and Initiatives

- Examples of Technical Assistance provided to Tribal Nations include:
  - Emergency communications planning support
  - Radio programming training
  - Gap analysis and technical assessment support
  - Special event planning/training
  - Assistance with establishing tribal dispatch capabilities
- Other ECD tribal initiatives include:
  - State, Local, Tribal, and Territorial Governance Guide Update
  - Tribal Emergency Communications Governance Profile Effort

Alaska: Assistance Provided

ECD's recent support to Alaska has included:

- **Training**: 4 COMLs and 20 AUXCOMM personnel trained on public safety incident communications
- **Technical Assistance**: Alaska Earthquake After Action Report Development, SIEC Meeting Support; AUXCOMM Training



Cybersecurity and Infrastructure Security Agency
Emergency Communications Division

Alaska Earthquake After Action Report:
Performance of ALMR

Background

The Alaska Land Mobile Radio (ALMR) provides needed emergency communications capability for State, local, and federal first responders and public safety entities in Alaska, through an integrated wireless network, that is secure, interoperable, cost effective, and technologically sound. ALMR was designed, built and implemented to provide mission-critical, day-to-day emergency response communications for its 124 DOD, Non-DOD Federal, state and local member agencies. ALMR is a Project 25 phase I trunked radio system operating in the VHF 150 MHz band. Anchorage Wide Area Radio Network (AWARN), which is ALMR Zone 4, is used by agencies operating within the Municipality of Anchorage (MOA) utilizing the 700 MHz band.

Timeline

At approximately 8:30 AM on November 30, 2018, a 7.0 earthquake struck the Anchorage and Wasilla area. Three ALMR sites located in the Wasilla area – *New Knik*, *Alcantra*, and *Cottonwood* – were momentarily in site trunking due to the temporary loss of microwave connectivity to the ALMR Master Site Zone Controller at Tudor Road in Anchorage.

Alaska Land Mobile Radio System Management Office

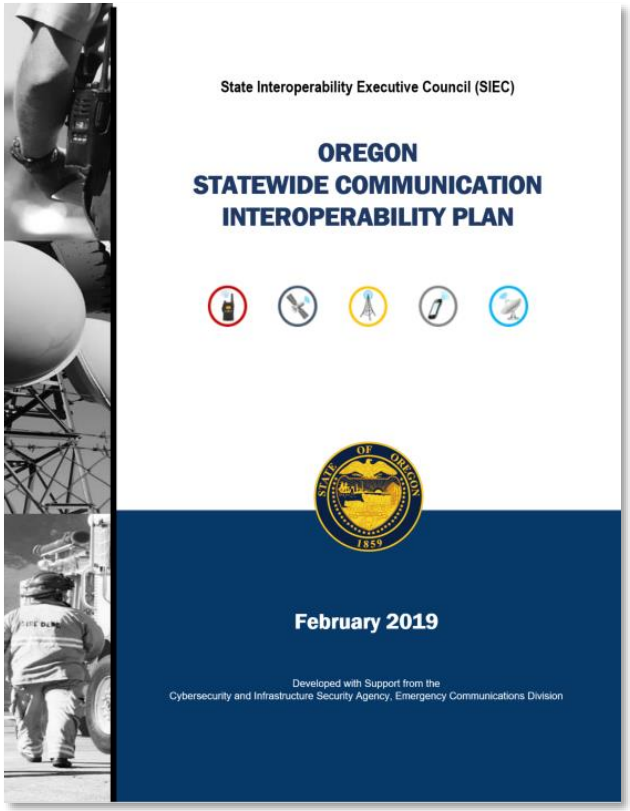
According to the ALMR System Management Office (SMO) staff who were monitoring the System, these three sites immediately returned to wide area trunking when the tremors ended. No further loss of connectivity to any ALMR site occurred despite continued aftershocks. The SMO staff continued to monitor the system throughout the day, in case any changes at the system level needed to be implemented.

- The initial system assessment by the SMO staff of system status revealed that all ALMR sites, with the exception of the Goose Creek Correctional Center (GCCC), were fully operational and apparently had not suffered any damage affecting their operational status.
- The GCCC site is connected to the ALMR system by a "leased circuit" from Matanuska Telephone Association (MTA). That circuit failed and full connectivity to the site was not restored by MTA until two hours after the earthquake. The GCCC site remained in site trunking during the two-hour period, and no impact to communications within the facility was experienced.
- Two alternate dispatch consoles on Joint Base Elmendorf-Richardson (JBER) lost connectivity due to power failure to both locations. All primary dispatch locations were up and operational throughout the incident.

Idaho: Assistance Provided

- ECD’s recent support to Idaho has included:
- **Training:** 24 COMLs, 15 COMTs, and 11 AUXCOMM personnel trained on public safety incident communications
- **Technical Assistance:** AUXCOMM Training, TICP Workshop, TIC-FOG Development, Encryption Planning and Usage, SCIP Workshop
- **Planning:** SCIP last updated in August 2016 / FY19 request on the books

Oregon: Assistance Provided


State Interoperability Executive Council (SIEC)

OREGON
STATEWIDE COMMUNICATION
INTEROPERABILITY PLAN

February 2019

Developed with Support from the
Cybersecurity and Infrastructure Security Agency, Emergency Communications Division

ECD’s support to Oregon has included:

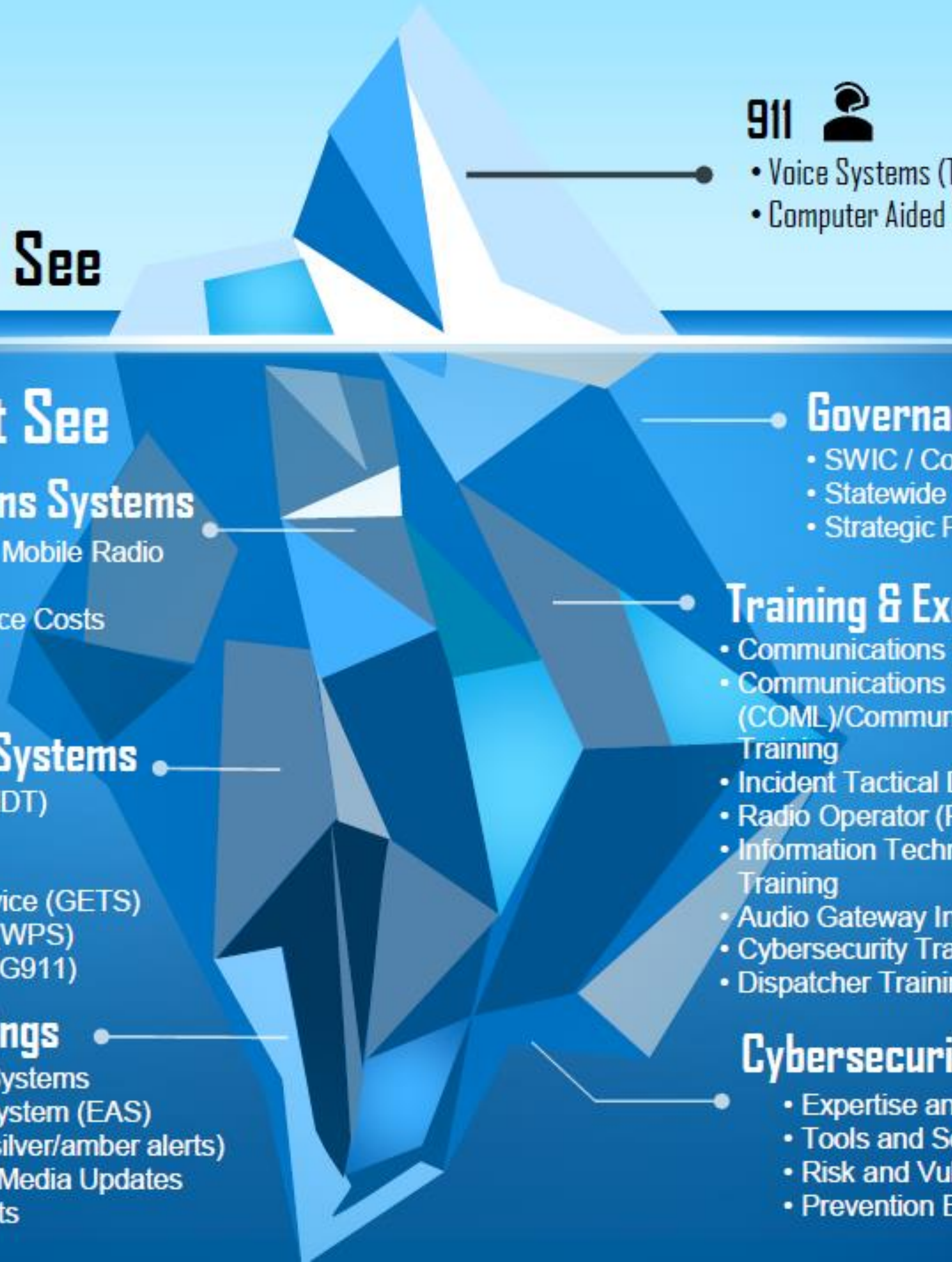
- **Training**: 225 total COMLs, COMT’s, and AUXCOMM personnel trained on public safety incident communications
- **Technical Assistance**: Radio System Analysis, CAD to CAD Data Exchange, National Interoperability Channels Review, Snow Emergency After Action Report
- **Planning**: SCIP updated in 2019

Washington State: Assistance Provided

ECD’s support to Washington:

- **Training**: 259 COMLs, 48 COMTs and 87 AUXCOMM personnel trained on public safety incident communications
- **COML** Training Course **June 25-27 at Camp Murray**, **COMT** Training Course **September 9-13 at Camp Murray**,
- WA State Training officer Justin Ford is posting these upcoming classes on the State training website

The True Scope & Cost of Emergency Communications



What Most People See

911

- Voice Systems (Telephone)
- Computer Aided Dispatch (CAD) Systems

What People Don't See

Radio Communications Systems

- Mobile and Portable Land Mobile Radio (LMR)
- Interoperability Maintenance Costs
- Communication Towers
- Tower Equipment Sheds

Broadband & Data Systems

- Mobile Data Terminals (MDT)
- FirstNet
- Government Emergency Telecommunications Service (GETS)
- Wireless Priority Service (WPS)
- Next Generation – 911 (NG911)

Alerts & Warnings

- Outdoor Warning Systems
- Emergency Alert System (EAS)
- IPAWS (including silver/amber alerts)
- TV/Radio/Website/Media Updates
- Social Media Outlets

Governance

- SWIC / Communications Champion
- Statewide Communications Office
- Strategic Planning

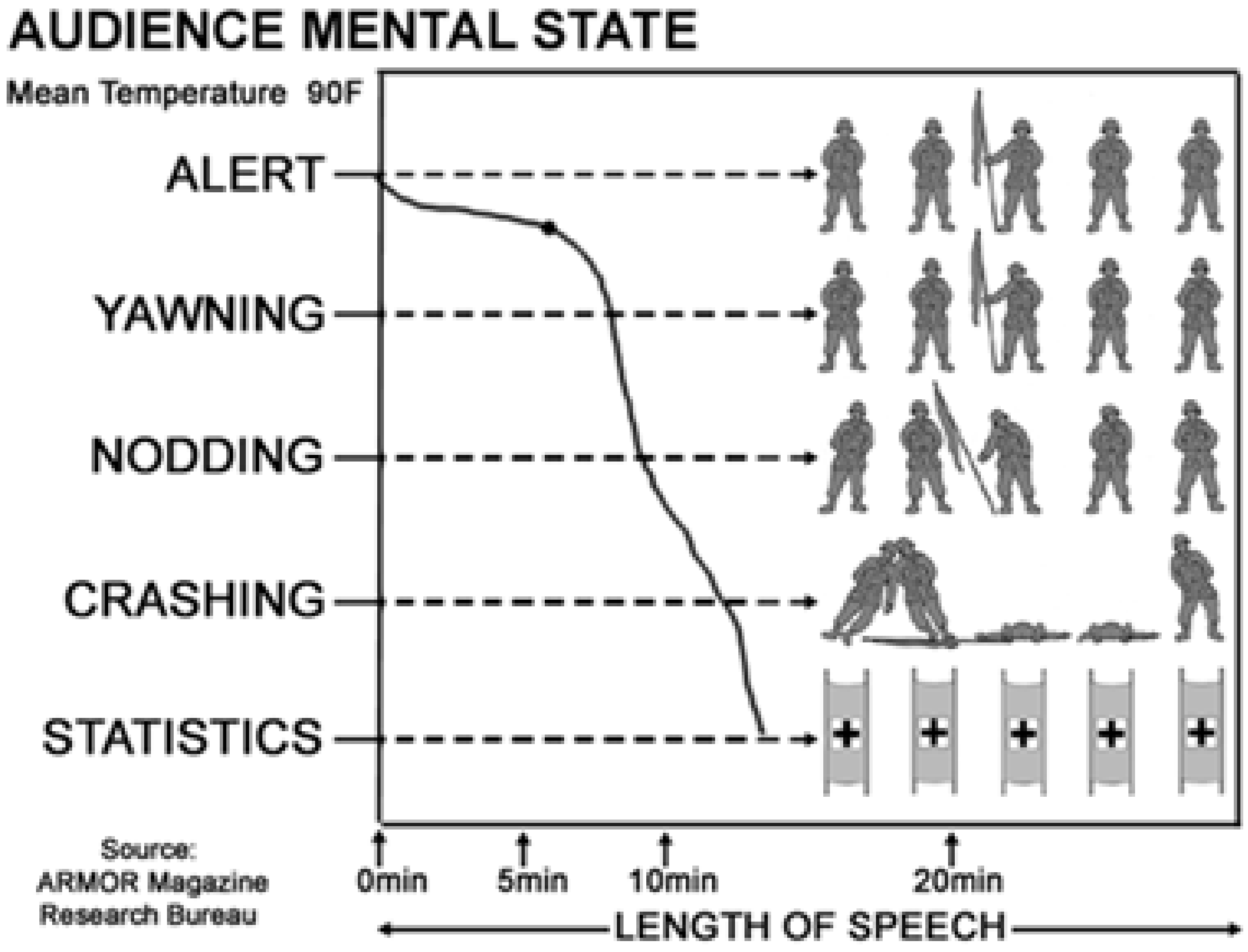
Training & Exercises

- Communications Unit Exercise (COMMEX)
- Communications Unit Leader (COML)/Communications Technician (COMT) Training
- Incident Tactical Dispatcher (INTD) Training
- Radio Operator (RADO) Training
- Information Technology Service Leader (ITSL) Training
- Audio Gateway Information and Training
- Cybersecurity Training and Awareness
- Dispatcher Training

Cybersecurity

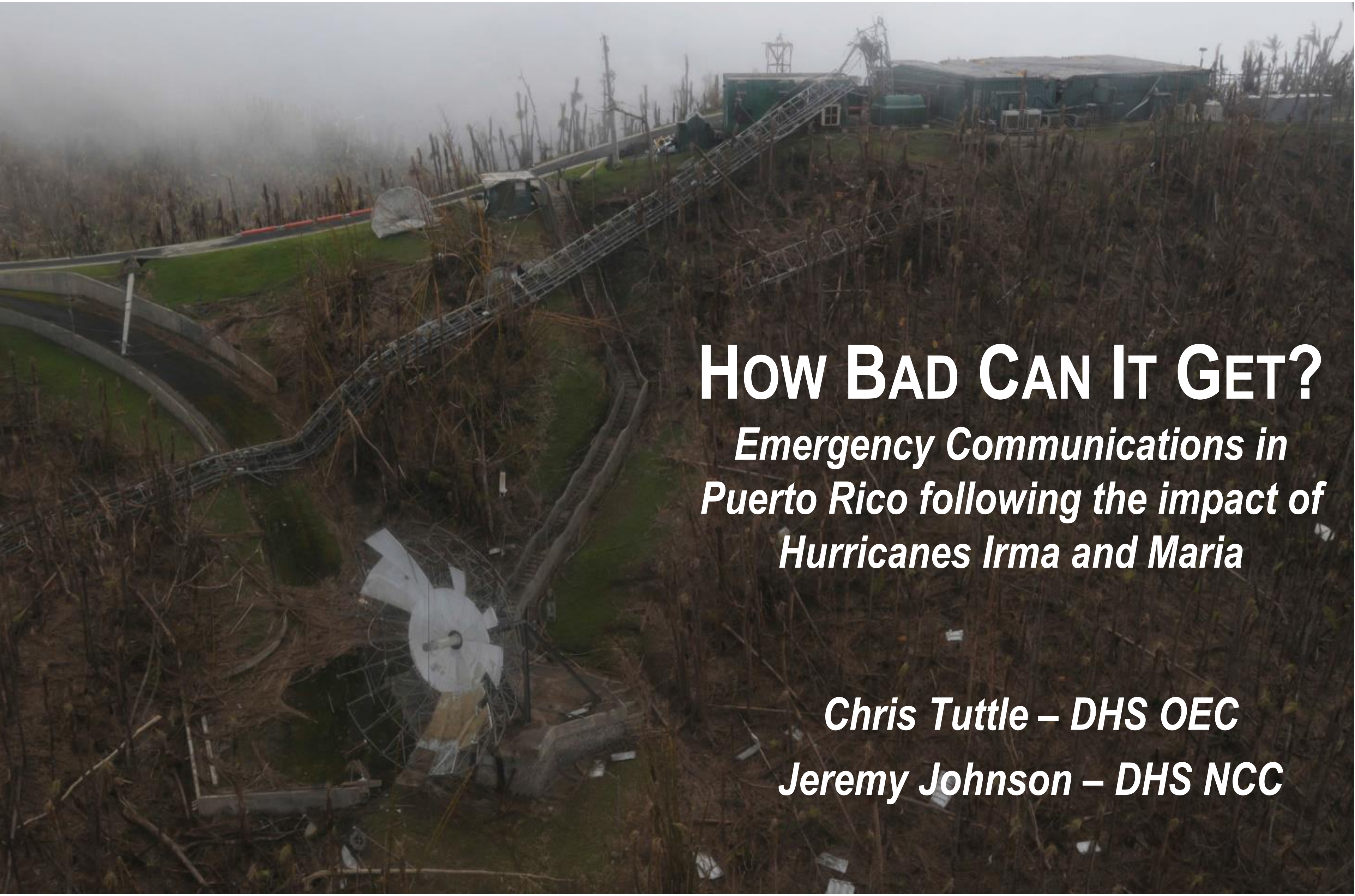
- Expertise and Planning
- Tools and Solutions
- Risk and Vulnerability Management
- Prevention Equipment and Training

How Are We Doing?



COMMUNICATIONS RESPONSE TO CATASTROPHIC EVENTS

- **Hurricanes**
  - 2017 Hurricanes Irma and Maria strike Puerto Rico
  - 2018 Hurricane Florence strikes North Carolina
- **Volcanic Eruption**
  - 2018 Kileau East Rift Eruption in Hawaii
- **Earthquake**
  - Nov 2018 7.1 Earthquake Anchorage, Alaska



HOW BAD CAN IT GET?

Emergency Communications in Puerto Rico following the impact of Hurricanes Irma and Maria

Chris Tuttle – DHS OEC

Jeremy Johnson – DHS NCC

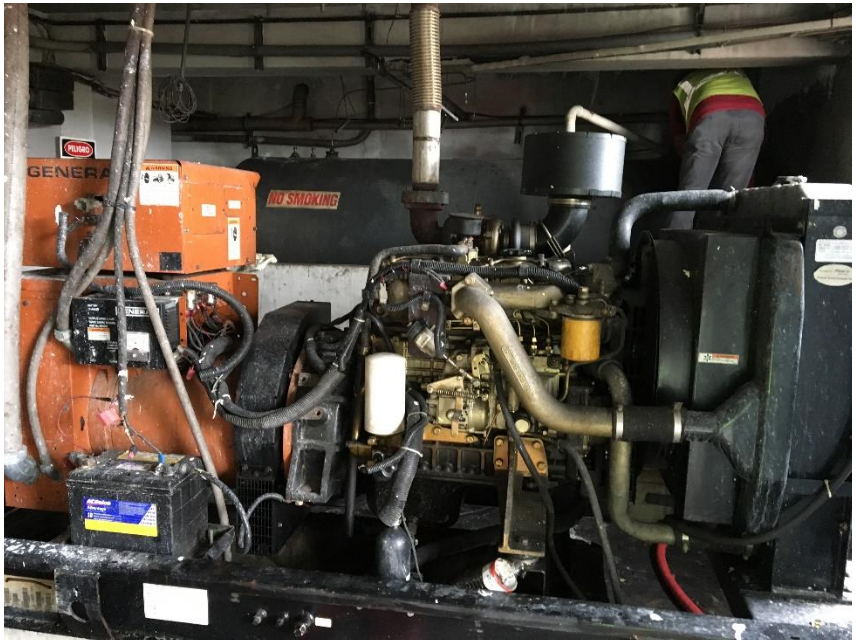
Plan for the Catastrophic Event

We must plan for the catastrophic event and not allow the resiliency of communications networks to lead us into a false sense of security.

Public Safety Communications Impacts

What was the situation before the event?

- Most tactical radio equipment on the island was end-of-life equipment
- No maintenance contracts in place.
- Many old communications systems abandoned in place on towers, adding to the tower load.
- Parts from retired equipment scavenged to keep other equipment operating.

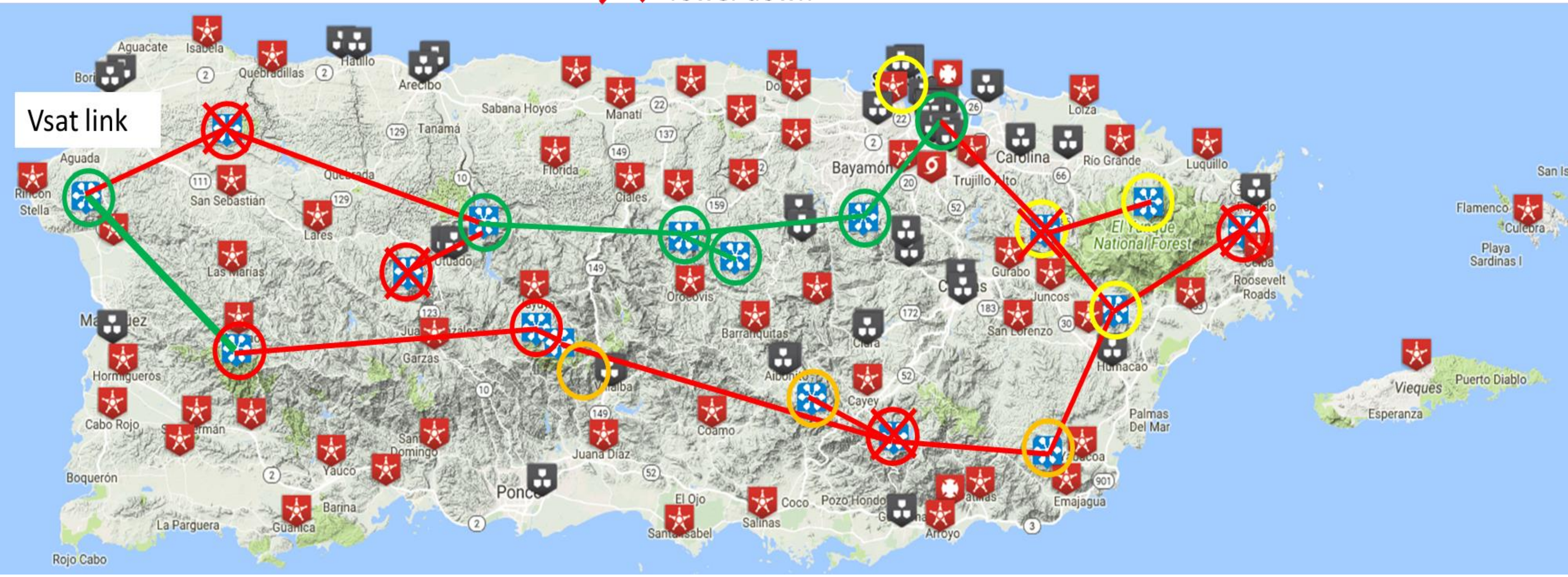


These conditions are not isolated to Puerto Rico,
they are found across the U.S. and are often tied to the lack of funding.

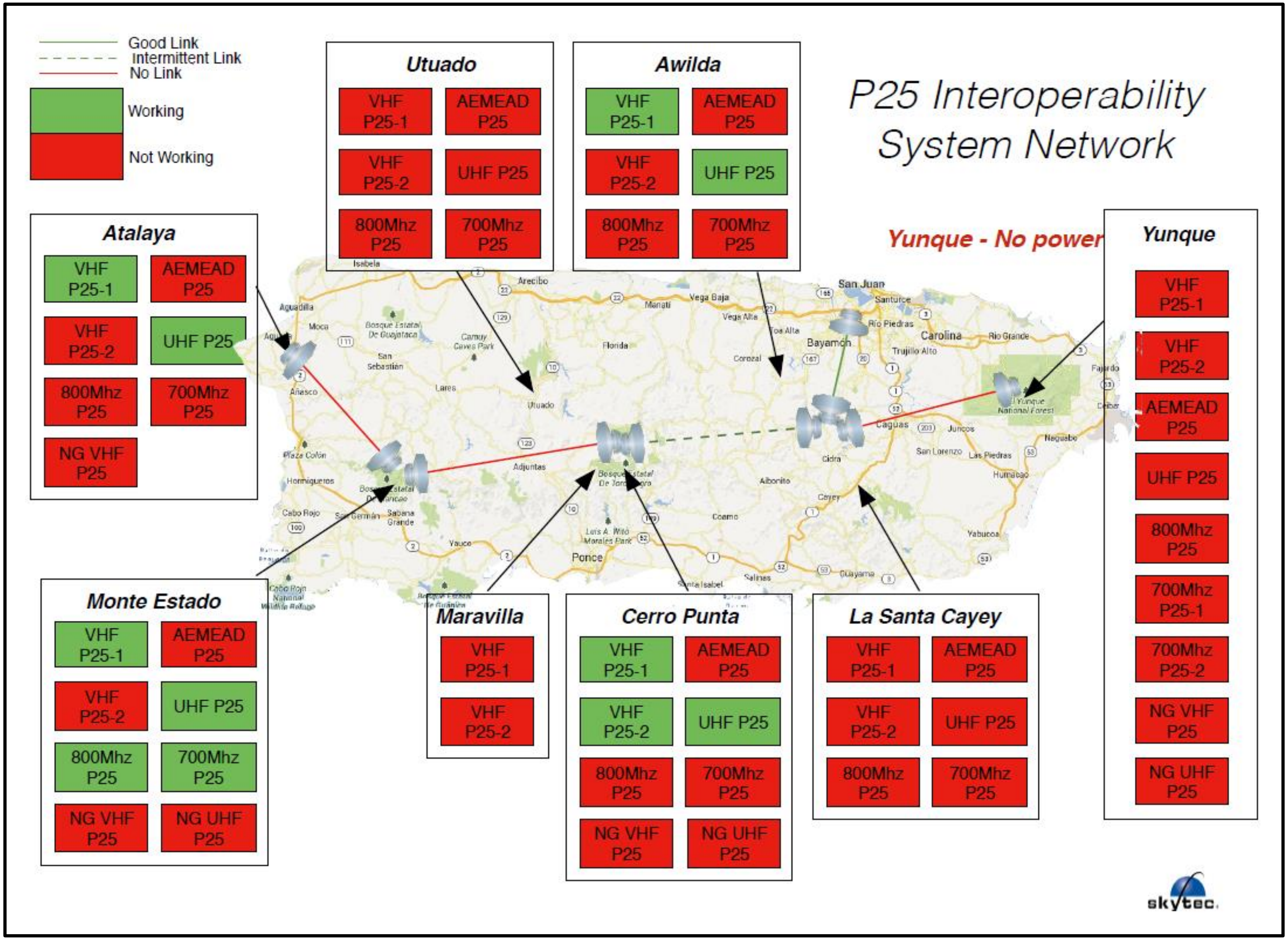
Status PRPD/Fire/Hospital 700/800 System

AWAITING PW FROM PREMA

- 🟢 On line and connected
- 🟡 On line Not connected
- 🟠 Out of diesel, cable or antennas
- 🔴 Off (out of power or wet)
- ✕ Tower down



Status Interoperability Network



P25 Interoperability System Network

Good Link
Intermittent Link
No Link

🟩 Working
🟥 Not Working

Yunque - No power

Atalaya
- 🟩 VHF P25-1
- 🟥 AEMEAD P25
- 🟥 VHF P25-2
- 🟩 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25
- 🟥 NG VHF P25

Utuado
- 🟥 VHF P25-1
- 🟥 AEMEAD P25
- 🟥 VHF P25-2
- 🟥 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25

Awilda
- 🟩 VHF P25-1
- 🟥 AEMEAD P25
- 🟥 VHF P25-2
- 🟩 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25

Yunque
- 🟥 VHF P25-1
- 🟥 VHF P25-2
- 🟥 AEMEAD P25
- 🟥 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25-1
- 🟥 700Mhz P25-2
- 🟥 NG VHF P25
- 🟥 NG UHF P25

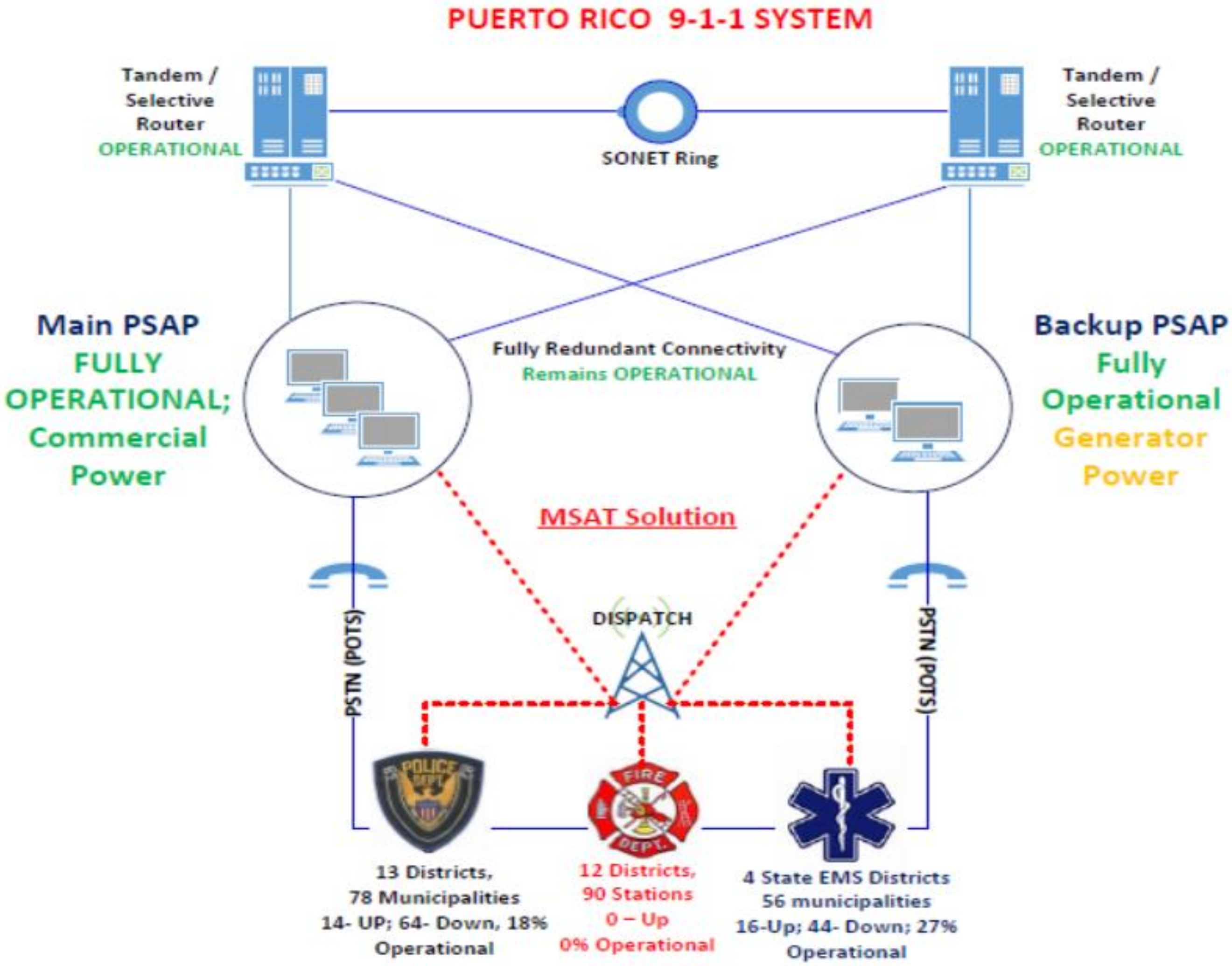
Monte Estado
- 🟩 VHF P25-1
- 🟥 AEMEAD P25
- 🟥 VHF P25-2
- 🟩 UHF P25
- 🟩 800Mhz P25
- 🟩 700Mhz P25
- 🟥 NG VHF P25
- 🟥 NG UHF P25

Maravilla
- 🟥 VHF P25-1
- 🟥 VHF P25-2

Cerro Punta
- 🟩 VHF P25-1
- 🟥 AEMEAD P25
- 🟩 VHF P25-2
- 🟩 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25
- 🟥 NG VHF P25
- 🟥 NG UHF P25

La Santa Cayey
- 🟥 VHF P25-1
- 🟥 AEMEAD P25
- 🟥 VHF P25-2
- 🟥 UHF P25
- 🟥 800Mhz P25
- 🟥 700Mhz P25

911 Status



PUERTO RICO 9-1-1 SYSTEM

Tandem / Selective Router
OPERATIONAL

SONET Ring

Tandem / Selective Router
OPERATIONAL

Main PSAP
FULLY OPERATIONAL; Commercial Power

Fully Redundant Connectivity
Remains OPERATIONAL

Backup PSAP
Fully Operational
Generator Power

MSAT Solution

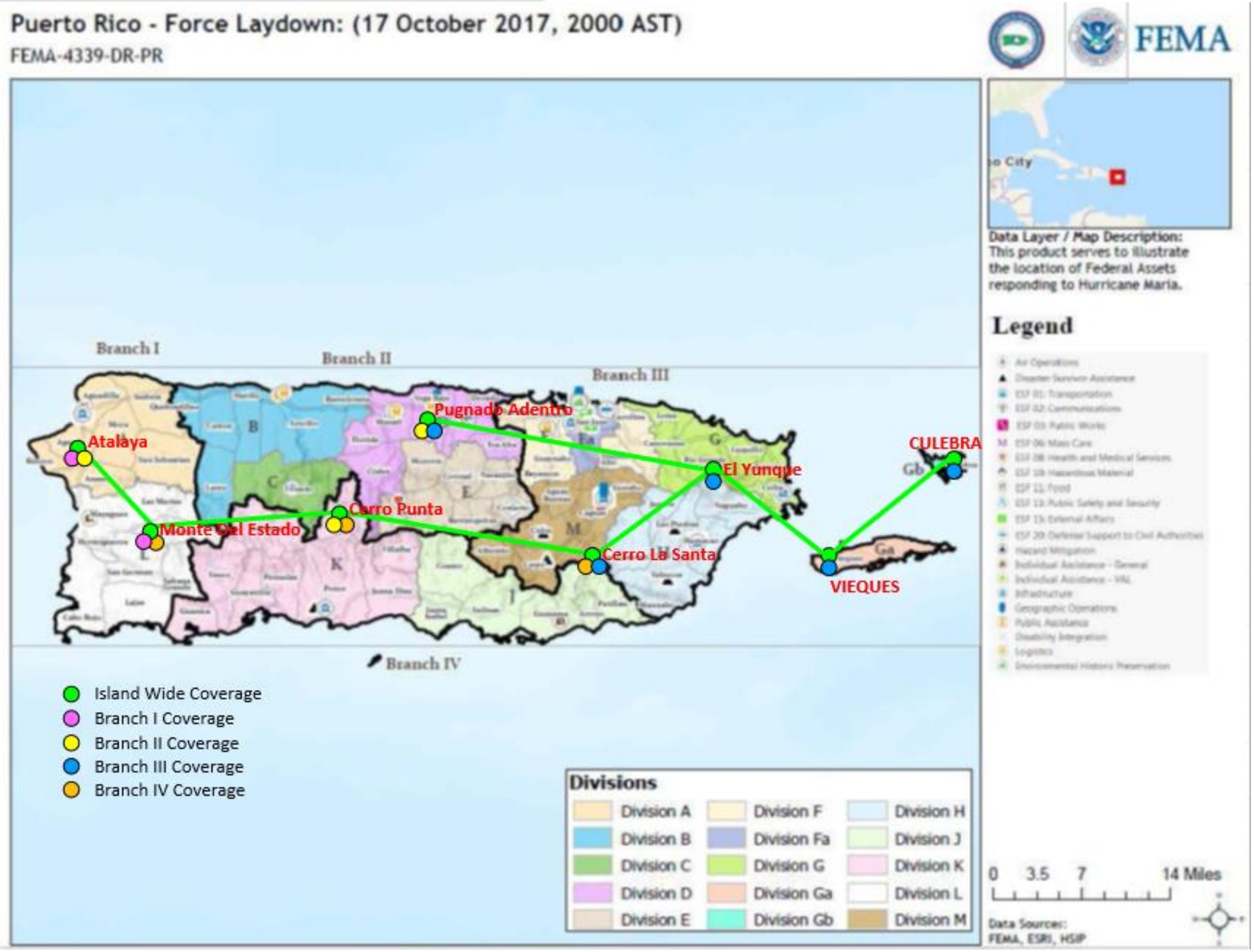
13 Districts,
78 Municipalities
14- UP; 64- Down, 18% Operational

12 Districts,
90 Stations
0 – Up
0% Operational

4 State EMS Districts
56 municipalities
16-Up; 44- Down; 27% Operational

UNCLASSIFIED//FOUO

Radio Coverage Areas



Puerto Rico - Force Laydown: (17 October 2017, 2000 AST)

FEMA-4339-DR-PR

Data Layer / Map Description: This product serves to illustrate the location of Federal Assets responding to Hurricane Maria.

Data Sources: FEMA, ESRI, HSIP

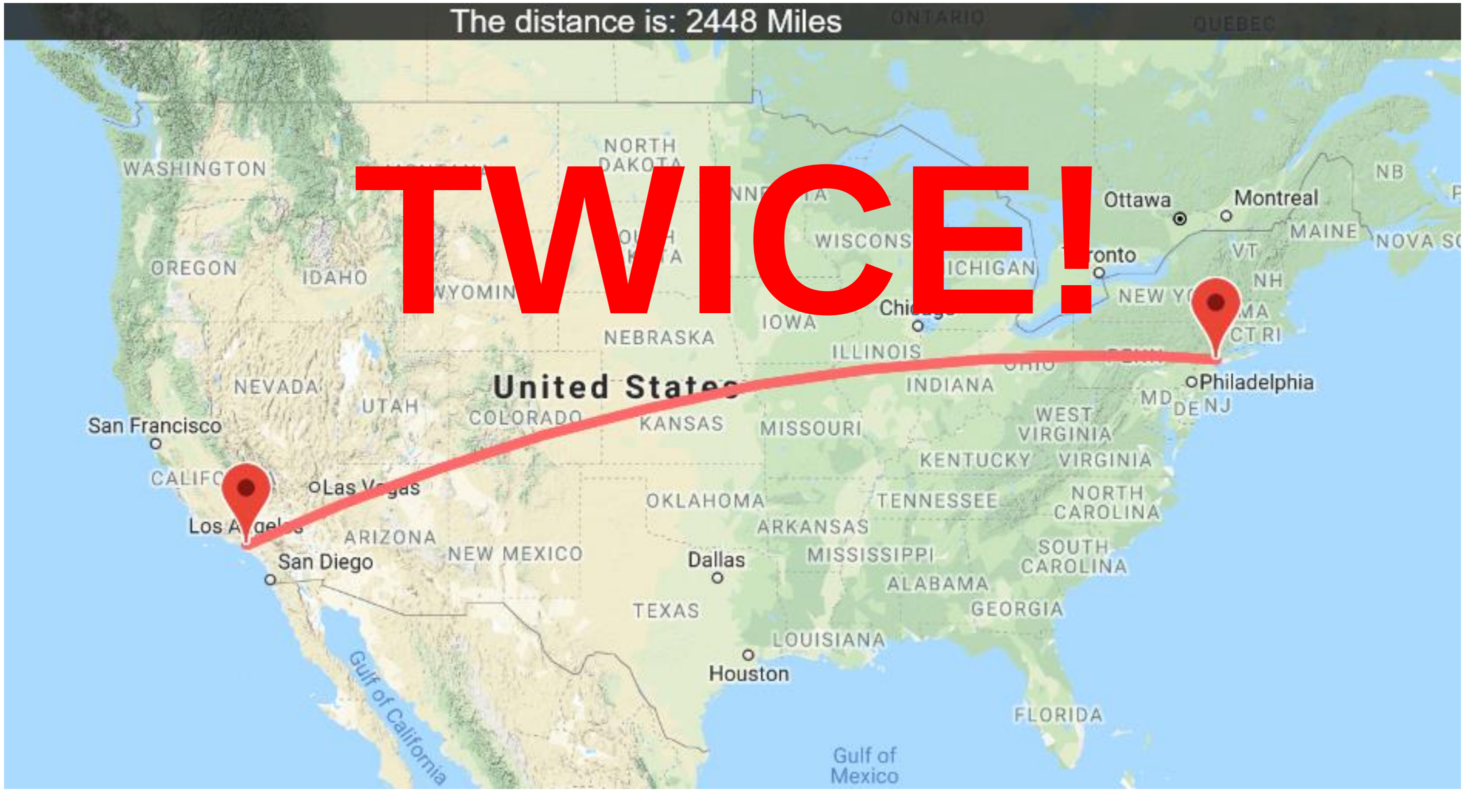
Commercial Communications

Impacts

- The wireline infrastructure was once publicly owned as the Puerto Rico Telephone Company (PRTC).
- PRTC was divided up and Claro became the Incumbent Local Exchange Carrier (ILEC) with AT&T and Liberty the major Competitive Local Exchange Carriers (CLECs) on the island.
- The **wireline providers lost 85 % of their Core Fiber** which measures roughly 350 linear miles per company.
- Additionally **each provider lost roughly 80-90 percent** of their roughly 1500 linear miles of last mile fiber.
- **This network supports much of the backhaul for wireless.**

Wireline Restoration

- To give you an idea of what it would take to restore that…think about stringing fiber from NYC to LA.



Wireline restoration challenges

- Conditions on the ground only exacerbated the restoration challenges.
  - Roughly ¾ of the poles on the island were down or compromised to the point where they had to be replaced.
  - Due to the lack of poles, fiber was literally being spliced and left on the ground.
  - As such fiber cuts were occurring daily
  - There were not enough fiber splicers available on the Island to support the recovery effort.

Wireless Status

- Following the event, less then 5% of roughly 2700 wireless sites on the island were still operational.
- The backhaul for almost all wireless sites was down.
- Sites that were operational, were unable to process calls due to network congestion.

Wireless restoration challenges

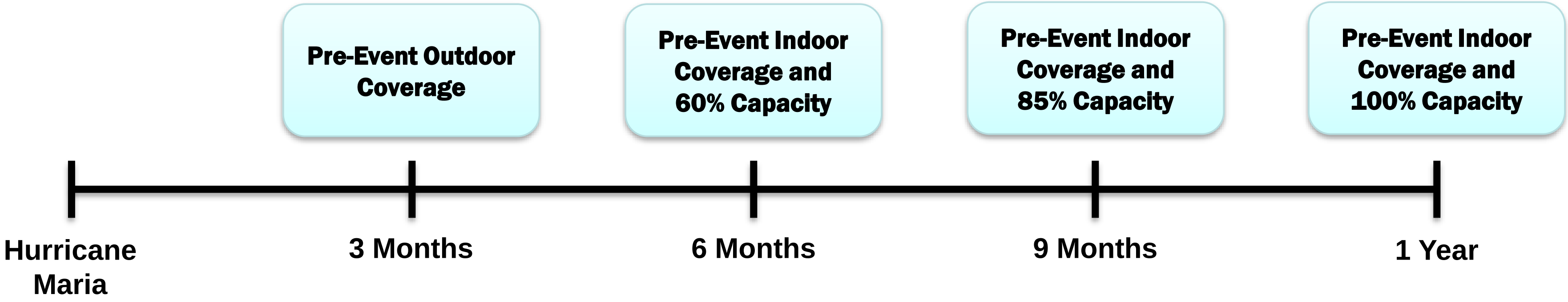
- Conditions on the ground only exacerbated the restoration challenges.
  - **Power** and **backhaul** were the primary issues impacting wireless.
  - Generators placed on cell sites were **stolen** in the middle of the night.
  - Fuel trucks were **hijacked** as they were attempting to keep cell tower generators full.
  - In the beginning of the event, carriers were being charged a Tax on all restoration equipment they were bringing to Puerto Rico.

Overcoming the Challenges Together

- Unparalleled cooperation amongst Wireless carriers paved the way for success

  - Universal roaming
  - Sharing resources
  - Fueling one another's equipment
  - Geographic approach to restoration allowed the carriers to maximize restoration capability.

Wireless Recovery Timeline



Pre-Event Outdoor Coverage

Pre-Event Indoor Coverage and 60% Capacity

Pre-Event Indoor Coverage and 85% Capacity

Pre-Event Indoor Coverage and 100% Capacity

Hurricane Maria

3 Months

6 Months

9 Months

1 Year

Did we learn anything?

Are there any high-level lessons learned or best practices that will help position us to do even better next time?

Successful, Together.

- A diverse team made up of communications personnel across the Federal Government made for a successful response to the most catastrophic communications impacts that have ever occurred in the U.S.

- It would not have been possible without all the agencies that were involved.

National Teams

- We need teams trained to handle catastrophic events.
  - The successes in Puerto Rico were directly attributed to having the right people with the right skills-sets and response-minded mentality deployed together.
  - Developing national teams with set rosters would ensure:
    - Team members have opportunities to train and exercise as a team.
    - Members understand:
      - their own role;
      - the part they play in the overall effort;
      - and strengths and weakness of the team members they work with.

Positions and Responsibilities

- We need to relook at the Disaster Emergency Communications (DEC) Group structure and associated positions.
  - We need to ensure our staffing pattern includes all the right positions.
  - We need to define what each position is responsible for.
  - We need to define deliverables for each position and formats for the deliverables.
- There is no time in catastrophic events to waste time figuring out what we should do.
  - We need each player to land on the ground with an understanding of exactly what they need to do and how they need to do it.

Surge Capacity

- We need to further develop our ability to leverage communications support from the surge capacity workforce.
  - DHS has an internal surge workforce
  - Can we target other federal communications personnel?
  - Can we tap into surge forces to leverage RECCWG members?

Do we have the right tools?

- We need to look at our ability to rapidly mobilize the right equipment and capabilities.
  - Do we have the right equipment on-hand, or are we able to access the right equipment through standing contracts, in order to re-establish some form of communications network when pre-disaster networks are destroyed?
    - Rapidly deployable LMR network
    - MSATs
    - Base station radios
    - Basic portable radios
    - Microwave

  - Do we have the means to rapidly deploy all the capabilities we may need from other federal agencies?

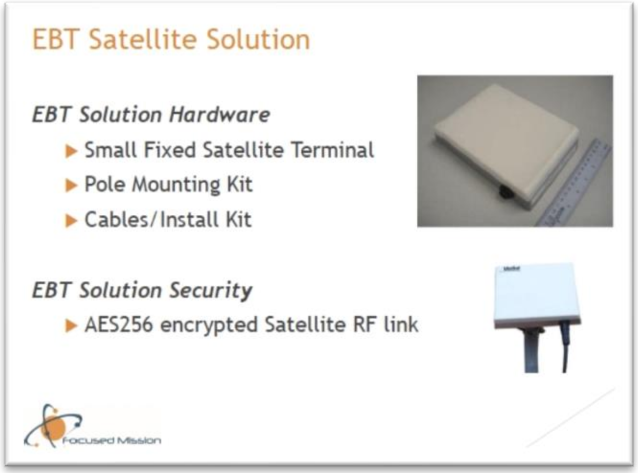
    - Pre Scripted Mission Assignments (PSMAs)
      - 85th Engineering Installation Squadron
      - DoD satellite capabilities

Amateur Radio

- **Amateur radio operators** were a **vital part of the operation** which enabled communications with key nodes.
- Challenging issues:
  - Deploying Fed agencies do not employ the volunteers
  - This raises challenges deploying volunteers in Federal support
    - Security Clearances can be an issue
    - Command and control supporting federal operations Is largely defined for fed employees, not volunteers

Innovative Technology Solutions

- Are we adequately researching innovative solutions?
  - Do we know all the possible solutions are out there and how to get them?
  - It is difficult to sort through the barrage of capabilities when you are in the middle of a response.
  - **Exercises** are the time to train and test those proposed innovations, **not** for the first time in a real world event.



EBT Satellite Solution

EBT Solution Hardware

- Small Fixed Satellite Terminal
- Pole Mounting Kit
- Cables/Install Kit

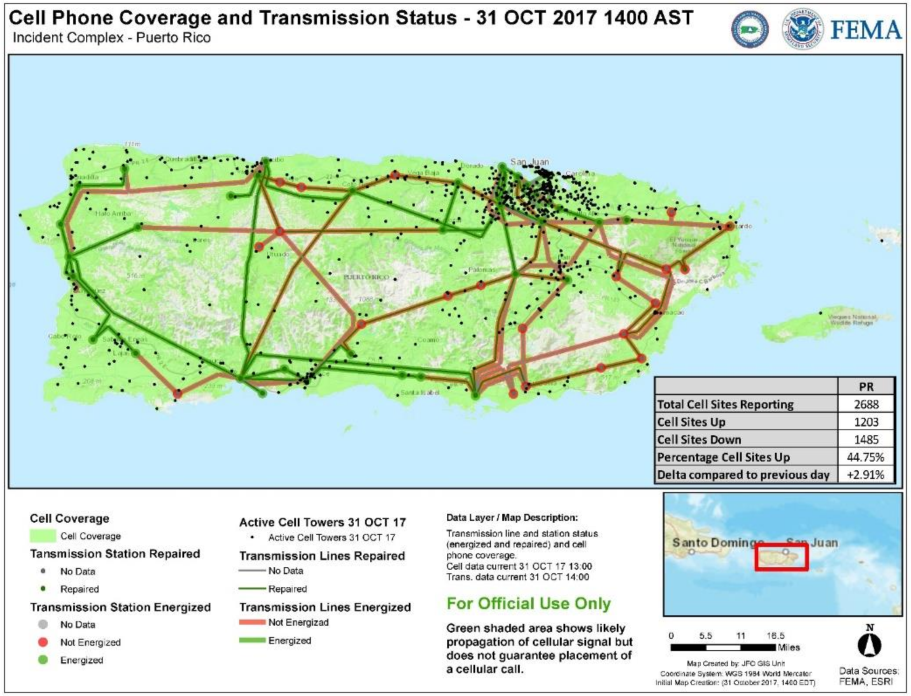
EBT Solution Security

- AES256 encrypted Satellite RF link

Focused Mission

Are we tracking the right information?

- In reporting:
    - Is all information we are gathering and presenting informing the response?
    - Is it the right information?
    - Is it packaged in the right way?
    - Does it include the “**So what**?”



Cell Phone Coverage and Transmission Status - 31 OCT 2017 1400 AST
Incident Complex - Puerto Rico

	PR
Total Cell Sites Reporting	2688
Cell Sites Up	1203
Cell Sites Down	1485
Percentage Cell Sites Up	44.75%
Delta compared to previous day	+2.91%

Data Layer / Map Description:
Transmission line and station status (energized and repaired) and cell phone coverage.
Cell data current 31 OCT 17 13:00
Trans. data current 31 OCT 14:00

For Official Use Only

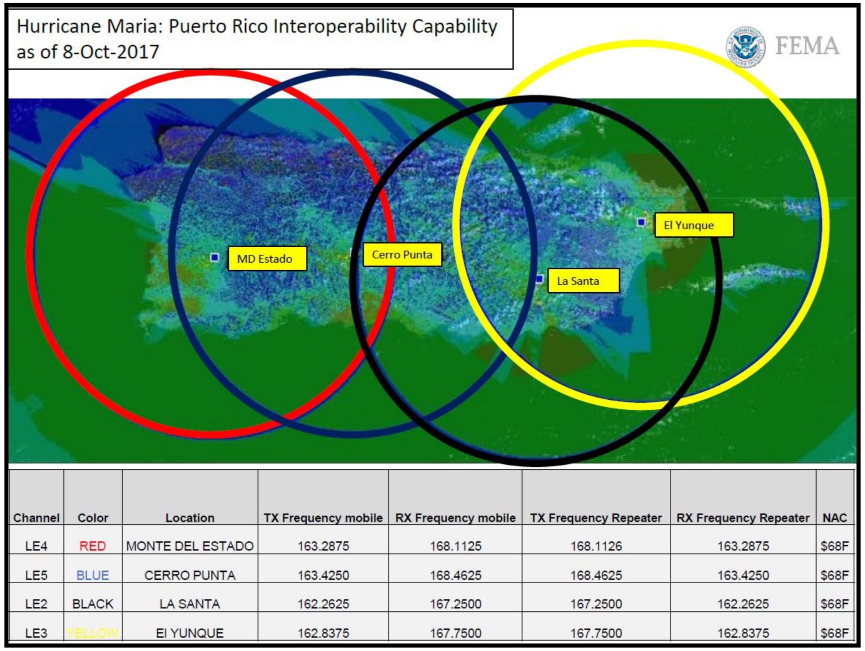
Green shaded area shows likely propagation of cellular signal but does not guarantee placement of a cellular call.

Map Created by: JFC GIS Unit
Coordinate System: WGS 1984 World Mercator
Initial Map Creation: (31 October 2017, 1400 EDT)

Data Sources: FEMA, ESRI

Spectrum Coordination

- Do the ICS 205 forms for the Incident Action Plan (IAP) need to contain every frequency being used, or just those available for interoperability?
- Are we simply gathering frequencies used, or coordinating with the appropriate folks to ensure interoperability?
- How do we inform non-technical folks what channels/frequencies they should use?

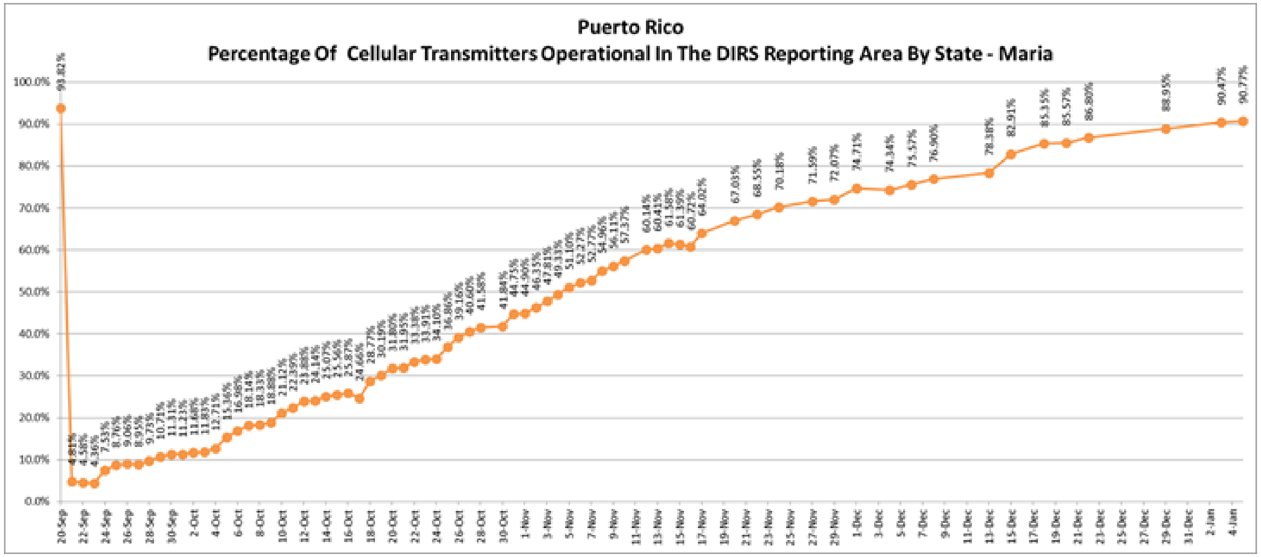


Hurricane Maria: Puerto Rico Interoperability Capability
as of 8-Oct-2017

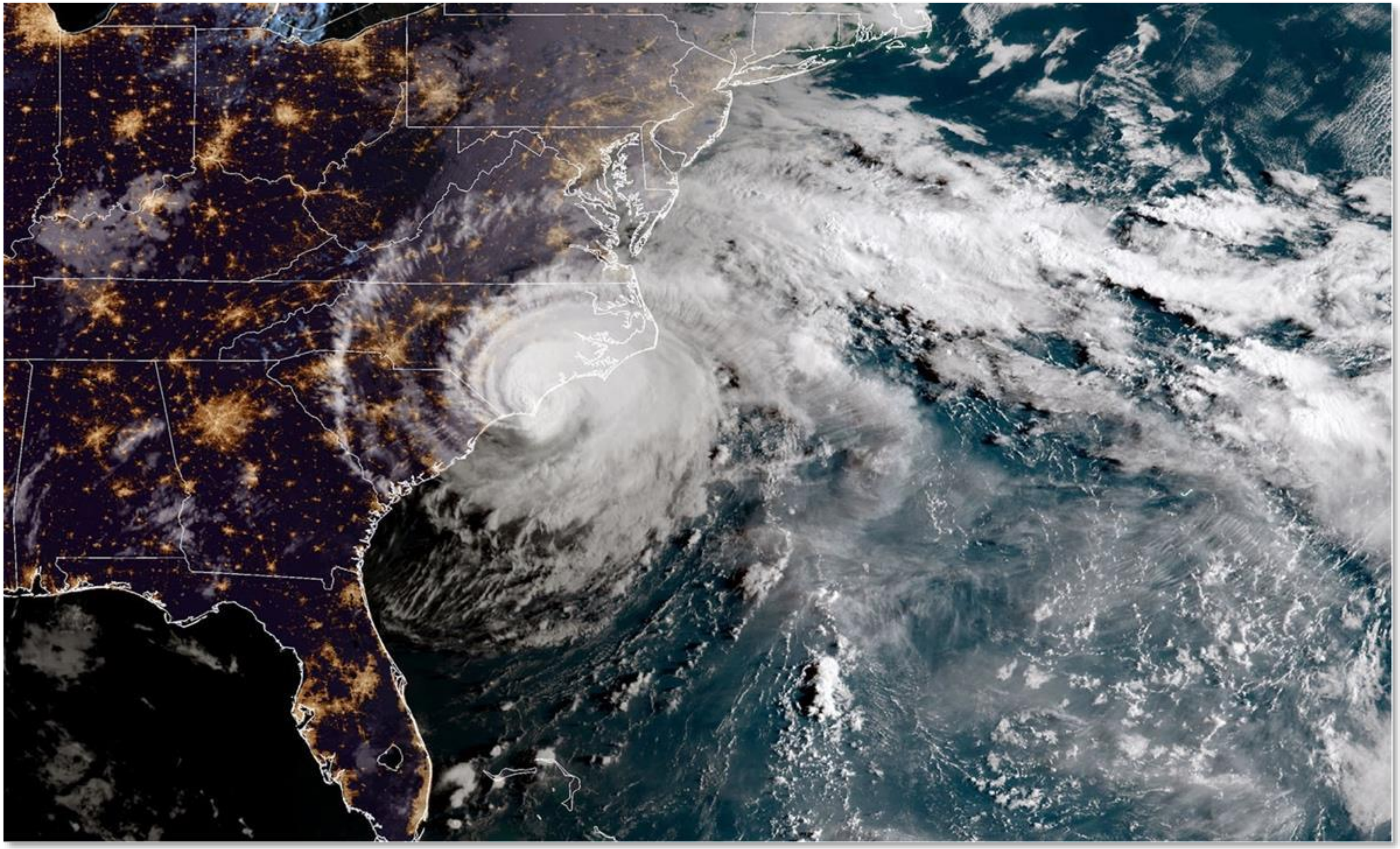
Channel	Color	Location	TX Frequency mobile	RX Frequency mobile	TX Frequency Repeater	RX Frequency Repeater	NAC
LE4	RED	MONTE DEL ESTADO	163.2875	168.1125	168.1126	163.2875	$68F
LE5	BLUE	CERRO PUNTA	163.4250	168.4625	168.4625	163.4250	$68F
LE2	BLACK	LA SANTA	162.2625	167.2500	167.2500	162.2625	$68F
LE3	YELLOW	EI YUNQUE	162.8375	167.7500	167.7500	162.8375	$68F

Recovery

- We need to be positioned to support recovery.
  - to positively impact the future resiliency of communications we need to be prepared to support through the recovery phase.
  - Its not as flashy as response, but it is where the entire community is needed.


Puerto Rico
Percentage Of Cellular Transmitters Operational In The DIRS Reporting Area By State - Maria

2018 Hurricane Florence



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Bruce Richter April 5, 2019

Florence After Action Report

- Key Successes: Performance of North Carolina Auxiliary Communicator (AUXCOMM) program
- AUXCOMM resources were pre-deployed at RCCs and local EOCs that made requests. AUXCOMM resources also provided assistance from their homes.
- North Carolina has a robust staffed and trained AUXCOMM cadre. AUXCOMM continues to be the first COMU resource mobilized in North Carolina for widespread natural disasters.
- AUXCOMM community has six (6) North Carolina credentialed COMLs. This adaptability and versatility makes North Carolina AUXCOMM a valuable resource.

Air to Ground Communications Issues

don’t assume someone has already solved the problem

What was needed

Air to Air and Air to Ground (AAAG) communications plan when asked:
Aircraft Taxiing frequency at Hilo airport

AAAG needed to address airspace deconfliction and landing zone coordination (evacuations). Elements that needed to be addressed:

- Multiple contract US Geologic Survey (USGS) helicopters
- At least (3) National Guard Blackhawks
- Multiple contract National Guard helicopters (tourist helicopters)
- (2) USMC Super Stallions
- (1) USGS drone
- (2) University of Hawaii drones
- Public Safety Ground units (Forward Air Controllers / Landing Zone Chief)

Solution : Find the Person with the right skill set

Warren Izumigawa

- Communications Manager Honolulu Police Department (on Oahu)

- Founding/senior member of Hawaii's Statewide Interoperability Governance Board (SIGB)

- Reservist/Senior NCO with Hawaii Air National Guard. Hawaii SWIC successfully requested to have Warren activated and placed in charge of Air to Air / Air to Ground communications planning on the island of Hawaii.

Monitoring Sensors

"Sulfur dioxide (SO2) emissions can cause acid rain and air pollution downwind of a volcano. At Kilauea, high concentrations of sulfur dioxide produce volcanic smog (VOG) causing persistent health problems for downwind populations."

Problem: Sensors Require Connection to the Internet

Solution:
Use multiple technologies to provide connectivity

- Ethernet
- Microcell (AT&T)
- BGAN Inmarsat Broadband Global Area Network

U.S. AIR FORCE

Disruption to Cellular Networks

- Access
- Power/Re-supply
- Backhaul
- Coverage

- Location
- Security
- Coverage
- Power
- Backhaul

MAHALO!

Sometimes the Disaster comes to you

Sometimes the Disaster comes to you

Sometimes the Disaster comes to you

Bruce Richter April 5, 2019

Sometimes the Disaster comes to you

Nov 30 2018

7.1 Alaska Earthquake

https://www.cnn.com/videos/us/2018/11/30/alaska-earthquake-damage-todd-dnt-tsr-vpx.cnn/video/playlists/alaska-earthquake/

Duck and cover drills work!

Strong building codes and enforcement helps!

Sometimes the Disaster comes to you

Feb 2011 6.3-magnitude earthquake Christchurch New Zealand killed 185 people, injured 6,000 and damaged 170,000 buildings

Jan 2010 7.0 Haiti Earthquake estimated death toll 316,000

Feb 2001 6.8 Nisqually Earthquake 1 dead 400 injured

Put simply each successive magnitude **is** 33 times larger than the last. That means magnitude **8.0 earthquake is** 33 times stronger than a **7.0**,

Magnitude **9.0 earthquake is 1,089** times (33 x 33) **more powerful** than a **7.0** — **the energy ramps up fast**

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Sometimes the Disaster comes to you

Aftershocks continue for Months, some would be quake of the year any other year.

Aftershocks cause more damage!

Schools are evacuated and **closed until they can be inspected** for damage, some **won't reopen** this year. How many of your schools are also emergency shelters?

Bridge, Elevator and Building Inspectors are a scarce resource.

Sprinkler pipes can rupture and cause **flooding damage**.

Clean Water is scarce, Boil Water advisory until Sewer and Water mains are checked.

Sometimes the Disaster comes to you

Hot wash lessons learned,

Next exercise have an inject that requires calling a satellite phone from your cell phone.

Then try to call back the other way.

Elevator Rescue is a scarce resource, remember the Seattle power outage?

911 Dispatch Centers suffer damage too.

Accurate situation reports help everyone.

Sometimes the Disaster comes to you

Half empty on your gas tanks means time to get fuel!

Credit Cards may not work, where's your cash?

Appliances were not designed for a prolonged shake test, some will fail.

Natural gas pipes can fracture. What's your heat source?

Substation transformers can shut down from shaking. Where is your backup light and power source?

What if it happens at night?

You are not Bruce Willis in *Die Hard.*   That was a movie! Broken glass and bare feet makes you a casualty. Where are your shoes and gloves?

Prepare Before the Disaster comes to you

- **Museum Wax**
- **Locking Picture Hangers**
- **Plastic LED Light Fixtures instead of Glass**
- **Not just straps for water heaters!**
- **Velcro or tie straps for china cabinets, furniture and large TVs,**
- **Magnetic Catches for cabinets**
- **Ways to purify water and heat food**
- **Sanitation**

PACE

Primary, Alternate, Contingency and Emergency

https://www.ktuu.com/content/news/Ham-amateur-radio-operators-ready-to-respond-in-Alaska-497299581.html

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Prepare before the Disaster

“Things to ponder and prepare for before another situation arises. Keep your fuel tanks to at least 3/4s of a tank. Have your go boxes, put together and ready to go. Emergency rations, water, medications, warm clothing and things for your pets. If you have a fire place is it working, do you have wood, when was the chimney last cleaned? Do you have an emergency generator with spare fuel? Have spare batteries for flashlights and small items on hand. Have a bag with your radios ready to go. Radio go boxes. Pet emergency plans, backup power.”

“*Let’s help each other and be ready for the next possible event*.”

Advice from KL3IT at the MatSu Alaska amateur radio club
http://kl7jfu.com/

The Challenge for the Day

ECD Contact Information

Emergency Communications Division

www.dhs.gov/cisa/emergency-communications-division

www.dhs.gov/SAFECOM

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